ATTACHMENTS TO THE INVESTMENT DOCUMENT PACKAGE

The following are documents that show additional information on other site(s) in the following locations:

1) Nigeria (2)
2) United States (3+)
3) Austria (3+)

I have not included all the documentation that I have in the main investment package since each site will have its own set of documents, but I wanted to show in the initial investment document package all the required documents and timelines that we will prepare with each site application we have.

One other point that should be noted. When we start a preliminary evaluation on a specific site or geographical application, we may find as we work through the preliminary evaluation that we uncover some item that may create a problem as we move forward.

By having so many potential site applications available to us we are able to just pass on anyone site and move to another since we have thousands to choose from.

NIGERIA

IKERE GORGE DAM

Through our meeting with the Governor of Oyo State, we have been presented with a proposed existing Hydroelectric application that has been abandoned since around 1983 and has been sitting there waiting for us to come along with our technology.

The Ikere Gorge Dam is a major earth-filled dam in Iseyin local government area in Oyo State.There are four rivers which are feeding water to the reservoir of which the Ogun River contributes about 85% of the water.

In addition to a proposed Hydroelectric application, it was also designed for a major irrigation project, which has yet to be implemented.

The existing power house is still in place with certain pieces of equipment, but we would not have any interest in utilizing any of the equipment sitting in the power house.

The original design specifications show an expected Megawatt output of around 37MW. I am not sure that it ever could have produced that, but from our view, we have an existing dam, a penstock to deliver water through the dam, that could be utilized to produce power on the down side of the dam.

Final determination as to size of our proposed power plant would be determined by the historical flow data and the head variations that change seasonally through the year, but we are estimating around 6 -10MW. Final size determination will be made upon review of the historical flow data and head changes through the year.

This dam has been offered to us for Hydroelectric power generation, under a lease agreement, as shown in our previous site overview.

In regards to the irrigation potential, we should keep in mind that upon further investigations, we may find that we may also have the availability to also produce power at the end of the main water line that we would deliver to the farmers, coming from the discharge side of our new proposed power plant.

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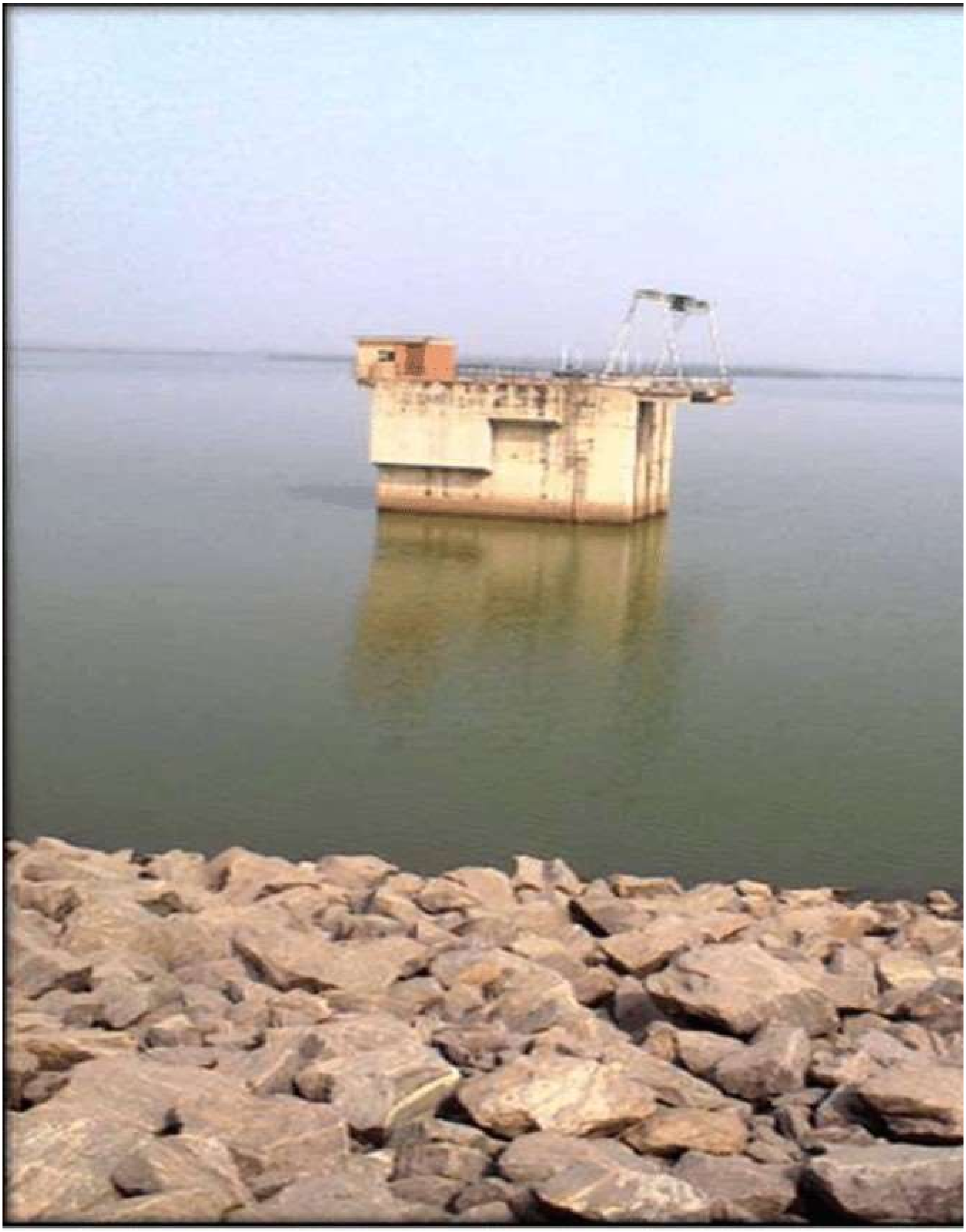


THE FINANCIAL PLAN IKERE GORGE DAM

			VARIABLES	
1 - Plant generation capacity	6	megawatts	Plant Cost	$ 12,000,000
2 - Construction cost per kilowatt	$ 2,000		Ann KWH	52566000
3 - Total cost of plant	$ 12,000,000		MW Size	6
4 – Power purchase agreement	30	year term	Build Cost	$ 2,000
5 – Anticipated construction time	18	months	Price/KWH	0.135
6 – Maintenance costs	6%		PPA Term	360
7 - Sales price of the power	0.135	per kwh	Const Time	18
7 - Percent of Maximum Flow	93%		% Max Flow	93%
9 - Plant Efficiency Percentage	80%		Efficiency %	80%
10 - Annual KWH production	36762558		Maint. Dsct	6.00%
11 - Annual Revenue	$ 4,962,945		Total Dsct	69.94%

Year	Ann. Revenues	Total Revenues	DISCOUNTS TO REVS	
1	$ -	$ -		
2	$ 4,962,945	$ 4,962,945		
3	$ 4,962,945	$ 9,925,891		
4	$ 4,962,945	$ 14,888,836		
5	$ 4,962,945	$ 19,851,781		
6	$ 4,962,945	$ 24,814,726		
7	$ 4,962,945	$ 29,777,672	Revenue	
8	$ 4,962,945	$ 34,740,617	Max Pos $	$7,095,600
9	$ 4,962,945	$ 39,703,562	Flow%Dsct	$5,676,480
10	$ 4,962,945	$ 44,666,508	Effcy%Dsct	$5,279,126
11	$ 4,962,945	$ 49,629,453	Maint. Dsct	$4,962,379
12	$ 4,962,945	$ 54,592,398	Total Dsct	$1,948,736
13	$ 4,962,945	$ 59,555,344		
14	$ 4,962,945	$ 64,518,289		
15	$ 4,962,945	$ 69,481,234		
16	$ 4,962,945	$ 74,444,179		
17	$ 4,962,945	$ 79,407,125		
18	$ 4,962,945	$ 84,370,070		
19	$ 4,962,945	$ 89,333,015		
20	$ 4,962,945	$ 94,295,961		
21	$ 4,962,945	$ 99,258,906		
22	$ 4,962,945	$ 104,221,851		
23	$ 4,962,945	$ 109,184,797		
24	$ 4,962,945	$ 114,147,742		
25	$ 4,962,945	$ 119,110,687		
26	$ 4,962,945	$ 124,073,632		
27	$ 4,962,945	$ 129,036,578		
28	$ 4,962,945	$ 133,999,523		
29	$ 4,962,945	$ 138,962,468		
30	$ 4,962,945	$ 143,925,414		

OWALLA DAM IN THE STATE OF OSUN

SOUTHWEST NIGERIA

The Owalla Dam is upstream from the old Ede Dam on the Erinle River. It is owned and operated by the Osun State Water Corporation. The Otin River enters the dam from the left. The reservoir behind the Owala Dam dam extends about 12 kilometers (7 mi) north along the Ernie River and covers the lowest portion of the Otin River.

The Owalla Dam, completed in 1989, is 330 meters (1,080 ft) above sea level. The crest length is 677 meters (2,221 ft) and maximum height is 27 meters (89 ft). The total storage capacity is 94,000,000 cubic meters (3.3x109 cu ft). The spillway discharges at 800 cubic meters (28,000 cu ft) per second. The dam is used for water supply, flood control and fishing.

OWALLA DAM PROJECT DESCRIPTION

The proposed hydroelectric development plan will utilize the existing Owalla Dam.

This dam site benefits the river basin by providing flood control, water supply, fish & wildlife conservation.

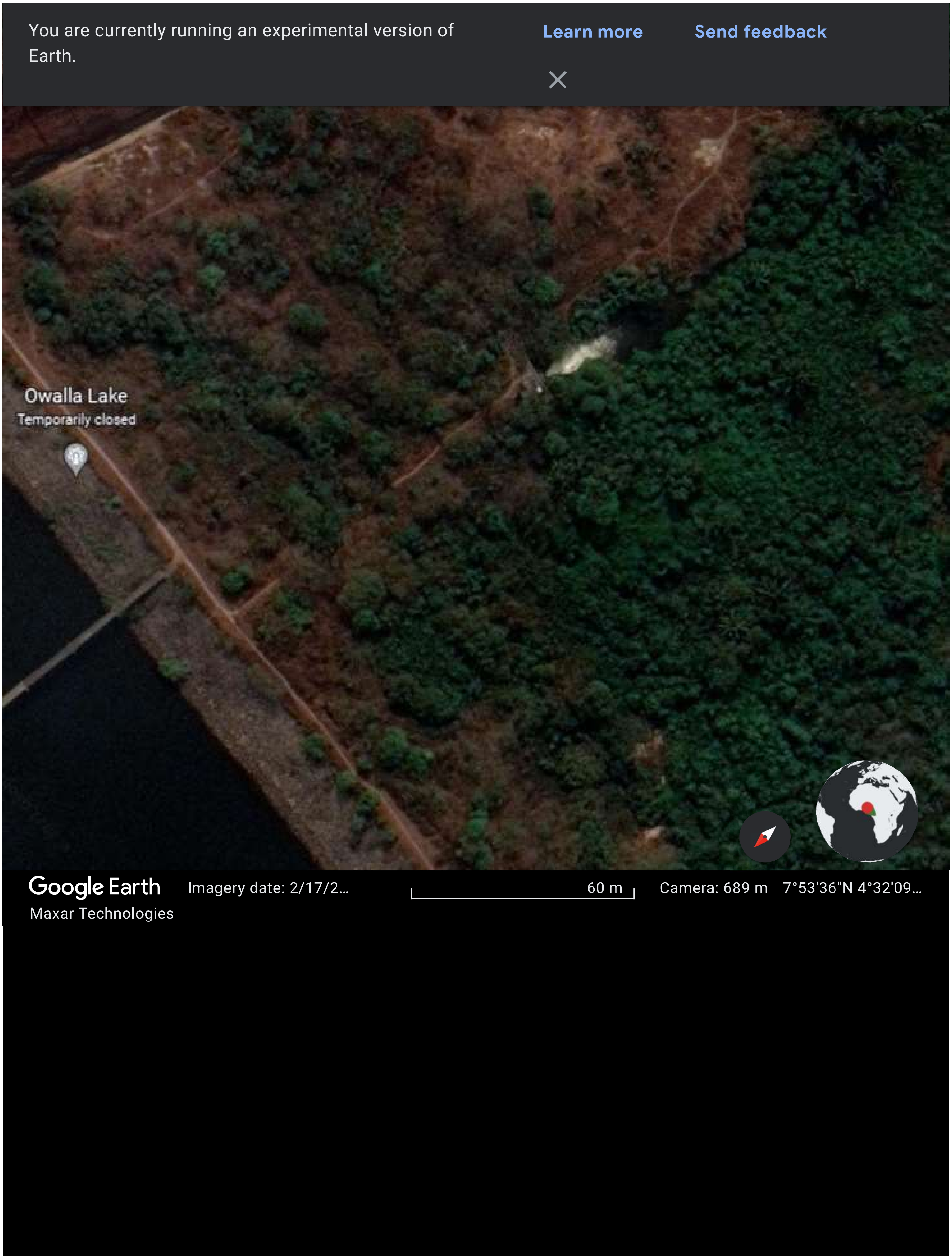
The proposed projects will require installing four turbines, building structures to house the turbine's and power conversion equipment and short transmission lines.

The utilities required are either on-site or available within a short distance. For the most part, roads and other facilities, including electrical transmission lines, are currently within the area of the proposed powerhouses.

It is proposed to utilize self-contained generating units to hold down construction costs. Those components which normally form integral components of a hydroelectric generation system such as diversion structures, dams, impoundments, and tailraces are already in position. Upon final inspection of the Dam site, we may decide to install our own intake structure on one side of the dam in the reservoir. This represents a major savings in planning, design, and construction costs that are otherwise normally a required part of a conventional hydroelectric power development project.

The only system elements which will be required are the power generation facilities and system connection lines. For the most part, the electrical transmission lines are already available near the site as a part of the existing electrical network, leaving only the actual powerhouse or power generation facility to be constructed. The final determination on the interconnection with the existing utilities will be made when we do the final site inspection. No facilities or other environmental protection measures are required.

The technology entailed in converting these potential site's energy into electrical energy consists of the proven technologies involved in small hydro-power production plants. Each site will utilize three new existing pipelines and one intake structures on the side of reservoir lake level and approximately 1,000 feet of new Penstock. Final determination as to whether we will be able to use existing intake will be determined upon further investigation. The water will flow from the power generation units into a dissipation system that will be determined with final engineering.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OWALLA DAM

				VARIABLES		
1 - Plant generation capacity		2.6	megawatts	Plant Cost	$	6,500,000
2 - Construction cost per kilowatt	$	2,500		Ann KWH		22776000
3 - Total cost of plant	$	6,500,000		MW Size		2.6
4 – Power purchase agreement		30	year term	Build Cost	$	2,500
5 – Anticipated construction time		18	months	Price/KWH		0.135
6 – Maintenance costs		6%		PPA Term		360
7 - Sales price of the power		0.135	per kwh	Const Time		18
7 - Percent of Maximum Flow		93%		% Max Flow		93%
9 - Plant Efficiency Percentage		80%		Efficiency %		80%
10 - Annual KWH production		15928623		Maint. Dsct		6.00%
11 - Annual Revenue	$	2,150,364		Total Dsct		69.94%

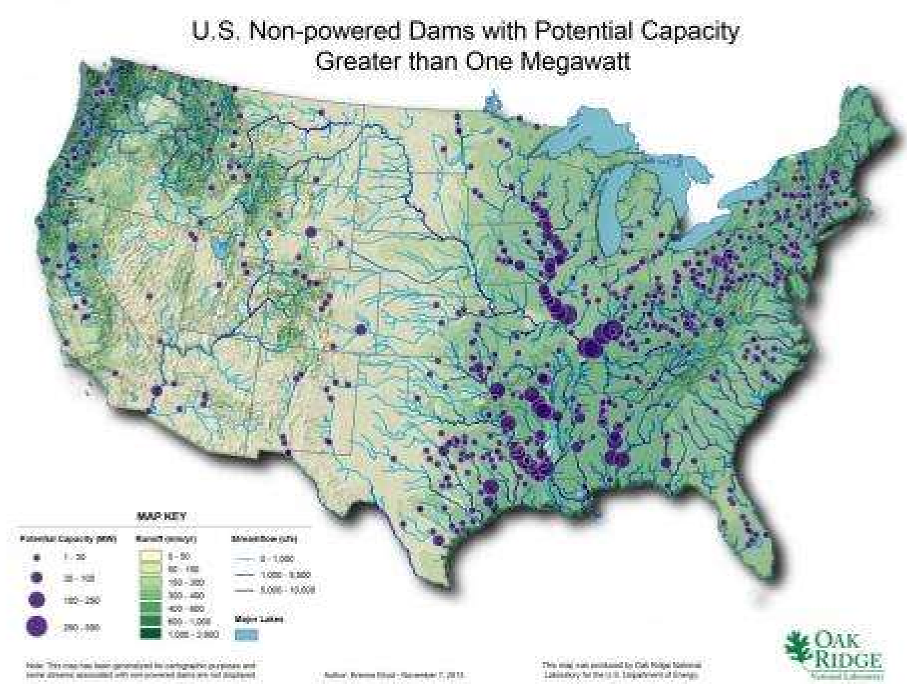
Year	**Ann. Revenues**	**Total Revenues**	**DISCOUNTS TO REVS**	
1	$ -	$ -		
2	$ 2,150,364	$ 2,150,364		
3	$ 2,150,364	$ 4,300,728		
4	$ 2,150,364	$ 6,451,092		
5	$ 2,150,364	$ 8,601,457		
6	$ 2,150,364	$ 10,751,821		
7	$ 2,150,364	$ 12,902,185	Revenue	
8	$ 2,150,364	$ 15,052,549	Max Pos $	$7,095,600
9	$ 2,150,364	$ 17,202,913	Flow%Dsct	$5,676,480
10	$ 2,150,364	$ 19,353,277	Effcy%Dsct	$5,279,126
11	$ 2,150,364	$ 21,503,642	Maint. Dsct	$4,962,379
12	$ 2,150,364	$ 23,654,006	Total Dsct	$1,948,736
13	$ 2,150,364	$ 25,804,370		
14	$ 2,150,364	$ 27,954,734		
15	$ 2,150,364	$ 30,105,098		
16	$ 2,150,364	$ 32,255,462		
17	$ 2,150,364	$ 34,405,826		
18	$ 2,150,364	$ 36,556,191		
19	$ 2,150,364	$ 38,706,555		
20	$ 2,150,364	$ 40,856,919		
21	$ 2,150,364	$ 43,007,283		
22	$ 2,150,364	$ 45,157,647		
23	$ 2,150,364	$ 47,308,011		
24	$ 2,150,364	$ 49,458,376		
25	$ 2,150,364	$ 51,608,740		
26	$ 2,150,364	$ 53,759,104		
27	$ 2,150,364	$ 55,909,468		
28	$ 2,150,364	$ 58,059,832		
29	$ 2,150,364	$ 60,210,196		
30	$ 2,150,364	$ 62,360,560		

UNITED STATES

The United States has produced clean, renewable electricity from hydro-power for more than 100 years, but hydro-power-producing facilities represent only a fraction of the the infrastructure development that had taken place on the nation's waterways. In contrast to the roughly 2,500 dams that provide 78 GW of conventional hydro-power, the United States has more than **80,000** non-powered dams (dams that do not produce electricity) but were built for a variety of other services ranging from water supply, flood control to inland navigation.

Most important for our use is that the monetary costs and any environmental impacts of dam construction have already been incurred, so adding power to an already existing dam structure can often be achieved at a lower cost, with less risk, and in a shorter time frame than development of a new structure.

The abundance of these type of existing structures, the cost factor and environmental favorability of these types of dam, plus the long history of reliability and predictability of hydro-power, make these dams a highly attractive source of a renewable energy supply.



SAMPLE OF EXISTING DAMS

CHATFIELD LAKE DAM HYDROELECTRIC PLANT

The proposed project will be located at the Chatfield Lake Dam. The dam is located on the South Platte River, near the town of Littleton Colorado, in Douglas County, State of Colorado.

The Dam is a compacted earth-fill structure 13,136 feet long, rising 147 feet about the riverbed. The dam structure widens from 50 feet at the top to approximately 1,500 feet at the base. It impounds a reservoir with a normal storage of 27,000 acre feet.

The Dam was built by the Army Corps of Engineers for the purpose of flood control and in addition, it became one of many municipal water supply for the City of Denver.

The project includes the existing dam, new intake structure and new outlet works on the tail-race side of the dam.

It will utilize the variable run-of-the-river flows and variable heads associated with this dam.

Most importantly, this dam has been in operation since it was built in 1975 with no hope of ever being a Renewable source of power generation.

The loss of potential power on this dam since it was built is estimated to be around Five Hundred Twenty Million KWH, LOST!!

Please note that the flow on this site ranges from a low of 67 CFS to a high of 844 CFS, and the pressure will also change within the differential range of flows, making this a perfect site for :

VARIABLE SPEED TECHNOLOGY.

SAMPLE HISTORICAL FLOW DATA CHATFIELD DAM

Day of month	00060, Discharge, cubic feet per second,											
	Mean of daily mean values for each day for water year of record in, ft3/s (Calculation Period 1982-10-01 -> 2019-09-30) Calculation period restricted by USGS staff due to special conditions at/near site											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	78	70	82	162	668	765	570	320	223	105	139	76
2	76	72	91	164	699	792	605	323	211	115	128	82
3	70	74	86	176	706	767	589	347	207	107	127	87
4	70	71	100	174	682	791	586	419	186	145	132	90
5	76	72	102	188	703	747	578	429	181	135	137	89
6	80	74	107	192	672	661	568	412	175	131	145	90
7	85	75	104	190	655	698	571	412	156	123	147	89
8	84	75	102	197	687	654	579	378	151	121	144	91
9	80	77	103	219	679	686	559	341	131	124	140	85
10	78	80	107	239	668	706	556	342	126	134	135	84
11	81	82	112	259	699	684	540	333	132	124	130	81
12	85	79	105	259	724	673	503	307	166	127	116	84
13	82	83	104	250	720	682	482	296	132	128	108	84
14	81	84	106	256	736	672	485	298	118	132	108	86
15	76	84	107	254	728	642	440	310	124	130	111	90
16	78	87	120	265	709	623	414	325	119	129	107	91
17	74	84	120	278	761	674	415	307	117	135	106	83
18	75	85	123	281	731	676	397	293	123	135	106	77
19	78	91	133	297	774	657	417	315	121	116	102	70
20	78	91	133	295	784	681	419	311	101	114	105	71
21	74	89	133	333	744	662	373	303	107	130	109	75
22	73	87	133	387	758	625	362	305	94	127	107	77
23	75	91	142	444	770	606	412	309	106	123	104	83
24	72	89	163	511	786	638	390	340	100	120	94	80
25	70	92	158	520	799	652	362	311	98	121	94	73
26	67	93	159	584	840	671	374	294	98	132	91	72
27	68	89	167	610	844	635	326	275	98	130	86	70
28	69	85	173	609	796	634	315	284	105	136	87	70
29	69	105	165	620	767	595	327	282	110	131	76	72
30	68		164	657	738	559	350	268	109	137	75	75
31	71		170		730		353	255		146		79

ADDITIONAL PROPOSED GENERATION SITES IN COLORADO

In addition to the Proposed Chatfield Lake Dam Hydroelectric Power Plant, we have completed a Preliminary location site evaluation on the following proposed sites in the same geographical location as the Chatfield Lake Dam site.

They are:

COUNTY		AMOUNT IN MEGAWATT
EAGLE	5	49
PITKIN	10	32
GARFIELD	13	27
MESA	14	42
GUNNISON	16	65

Please understand that even though we have the capability of being able to utilize all flows and head in any application, we still operate from a profit point of view and I am sure that not all of the above will be profitable for us to finance. We will be able to determine which will be the best for us to develop.

The above is an small estimate of the over 258 existing potential sites in Colorado. These figures do not include any Pressure Reducers Valves already existing in the state and also does not include in canal drops used for irrigation purpose nor any Municipal water pipelines for city water consumption.

CHATFIELD DAM

			VARIABLES	
1 - Plant generation capacity	2	megawatts	Plant Cost	$ 4,000,000
2 - Construction cost per kilowatt	$ 2,000		Ann KWH	17520000
3 - Total cost of plant	$ 4,000,000		MW Size	2
4 – Power purchase agreement	30	year term	Build Cost	$ 2,000
5 – Anticipated construction time	18	months	Price/KWH	0.09
6 – Maintenance costs	6%		PPA Term	360
7 - Sales price of the power	0.09	per kwh	Const Time	18
7 - Percent of Maximum Flow	93%		% Max Flow	93%
9 - Plant Efficiency Percentage	80%		Efficiency %	80%
10 - Annual KWH production	12252787		Maint. Dsct	6.00%
11 - Annual Revenue	$ 1,102,751		Total Dsct	69.94%

Year	**Ann. Revenues**	**Total Revenues**
1	$ -	$ -
2	$ 1,102,751	$ 1,102,751
3	$ 1,102,751	$ 2,205,502
4	$ 1,102,751	$ 3,308,253
5	$ 1,102,751	$ 4,411,003
6	$ 1,102,751	$ 5,513,754
7	$ 1,102,751	$ 6,616,505
8	$ 1,102,751	$ 7,719,256
9	$ 1,102,751	$ 8,822,007
10	$ 1,102,751	$ 9,924,758
11	$ 1,102,751	$ 11,027,508
12	$ 1,102,751	$ 12,130,259
13	$ 1,102,751	$ 13,233,010
14	$ 1,102,751	$ 14,335,761
15	$ 1,102,751	$ 15,438,512
16	$ 1,102,751	$ 16,541,263
17	$ 1,102,751	$ 17,644,014
18	$ 1,102,751	$ 18,746,764
19	$ 1,102,751	$ 19,849,515
20	$ 1,102,751	$ 20,952,266
21	$ 1,102,751	$ 22,055,017
22	$ 1,102,751	$ 23,157,768
23	$ 1,102,751	$ 24,260,519
24	$ 1,102,751	$ 25,363,270
25	$ 1,102,751	$ 26,466,020
26	$ 1,102,751	$ 27,568,771
27	$ 1,102,751	$ 28,671,522
28	$ 1,102,751	$ 29,774,273
29	$ 1,102,751	$ 30,877,024
30	$ 1,102,751	$ 31,979,775

BELTZVILLE DAM

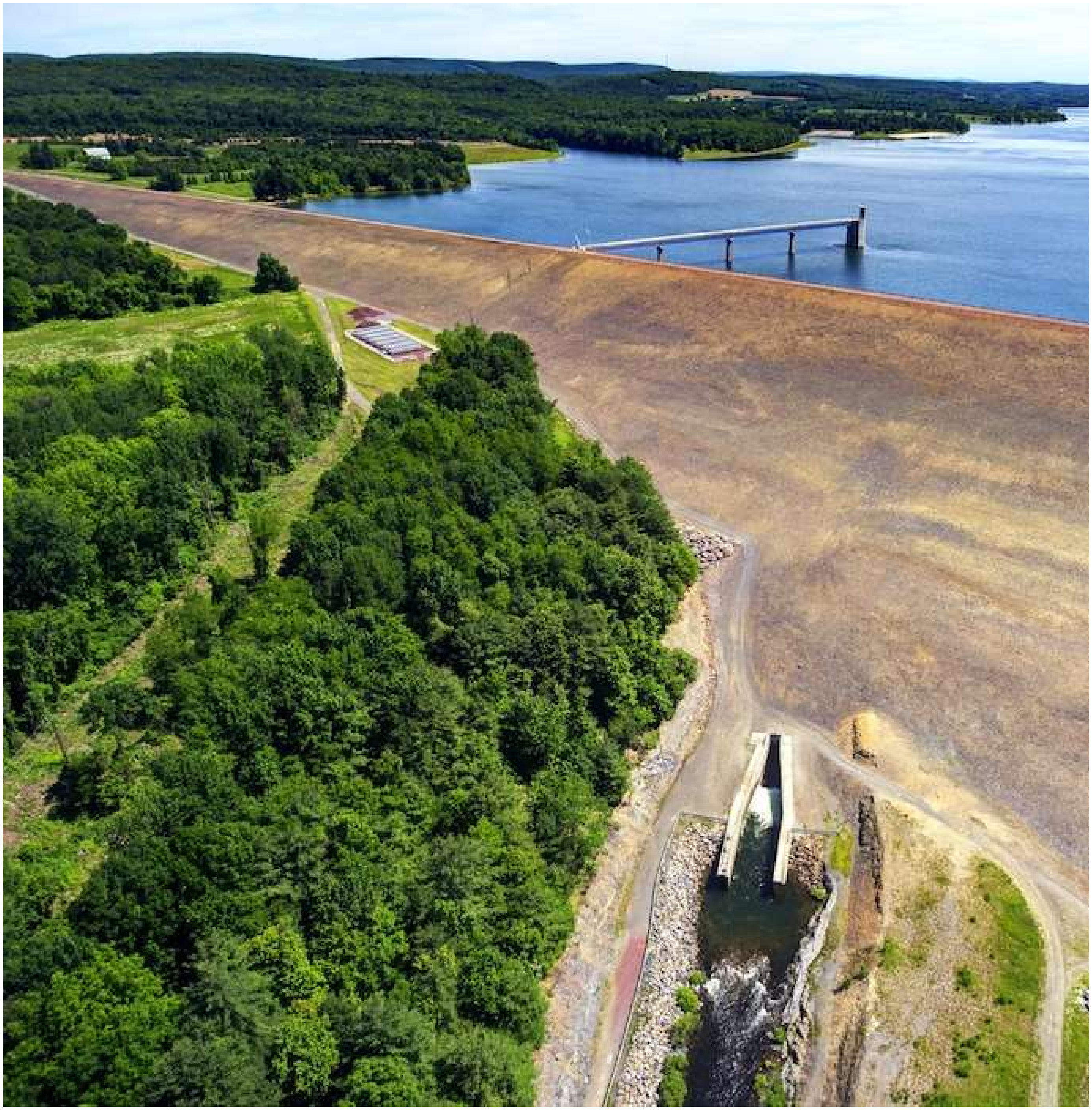
Project Overview

Beltzville Lake was constructed by the U.S. Army Corps of Engineers in 1972. The multi-purpose project was authorized by Congress primarily for flood risk management, water supply, and low flow augmentation; and authorized secondarily for water quality and recreation purposes. The Pennsylvania Department of Conservation & Natural Resources manages the 3,002 acre Beltzville State Park surrounding the lake, which attracts numerous visitors each year.

The dam is located on Pohopoco Creek 5.2 miles from its confluence with the Lehigh River and 4 miles east of Lehighton, Pennsylvania. Beltzville Dam operates as a system in conjunction with Francis E. Walter Dam, located in White Haven, to reduce flooding in the downstream communities along the Lehigh River. Since it's construction in 1972, the dam has prevented more than $41 million in flood damages to date.

Once again, this has been a wasted Renewable power generation source since it was built in 1972. Estimated power loss is around Three Hundred Million KWH’s.

Beltzville Dam & Reservoir



BELTZVILLE DAM

			VARIABLES		
1 - Plant generation capacity	2.15	megawatts	Plant Cost	$	4,300,000
2 - Construction cost per kilowatt	$ 2,000		Ann KWH		18834000
3 - Total cost of plant	$ 4,300,000		MW Size		2.15
4 – Power purchase agreement	30	year term	Build Cost	$	2,000
5 – Anticipated construction time	18	months	Price/KWH		0.08
6 – Maintenance costs	6%		PPA Term		360
7 - Sales price of the power	0.08	per kwh	Const Time		18
7 - Percent of Maximum Flow	93%		% Max Flow		93%
9 - Plant Efficiency Percentage	80%		Efficiency %		80%
10 - Annual KWH production	13171746		Maint. Dsct		6.00%
11 - Annual Revenue	$ 1,053,740		Total Dsct		69.94%

Year	**Ann. Revenues**	**Total Revenues**
1	$ -	$ -
2	$ 1,053,740	$ 1,053,740
3	$ 1,053,740	$ 2,107,479
4	$ 1,053,740	$ 3,161,219
5	$ 1,053,740	$ 4,214,959
6	$ 1,053,740	$ 5,268,698
7	$ 1,053,740	$ 6,322,438
8	$ 1,053,740	$ 7,376,178
9	$ 1,053,740	$ 8,429,918
10	$ 1,053,740	$ 9,483,657
11	$ 1,053,740	$ 10,537,397
12	$ 1,053,740	$ 11,591,137
13	$ 1,053,740	$ 12,644,876
14	$ 1,053,740	$ 13,698,616
15	$ 1,053,740	$ 14,752,356
16	$ 1,053,740	$ 15,806,095
17	$ 1,053,740	$ 16,859,835
18	$ 1,053,740	$ 17,913,575
19	$ 1,053,740	$ 18,967,315
20	$ 1,053,740	$ 20,021,054
21	$ 1,053,740	$ 21,074,794
22	$ 1,053,740	$ 22,128,534
23	$ 1,053,740	$ 23,182,273
24	$ 1,053,740	$ 24,236,013
25	$ 1,053,740	$ 25,289,753
26	$ 1,053,740	$ 26,343,492
27	$ 1,053,740	$ 27,397,232
28	$ 1,053,740	$ 28,450,972
29	$ 1,053,740	$ 29,504,712
30	$ 1,053,740	$ 30,558,451

FRANCIS E WALTER DAM

The Francis E Walter Dam and reservoir is located on the Lehigh River in Carbon and Luzerne Counties in Northern Pennsylvania. The dam is approximately 80 miles north of Philadelphia and was completed in 1961. The dam was originally authorized for flood control purposes. Congress added recreation as an additional authorized purpose in 1988.

The dam is an earth filled embankment dam with an impervious compacted earth core and rip-rap cover. The structure is 3,000 feet long and rises 234 feet above the stream-bed.

The outlet works consists of a 16 foot diameter tunnel with three primary intake gates and three emergency intake gates. Thee is also an emergency spillway located on the north abutment.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Francis E. Walter Dam
Lehigh River
Lehigh River
Lehigh River
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200 m
Camera: 1,306 m
41°07'05"N 75°43...
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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FRANCIS E WALTER DAM

			VARIABLES		
1 - Plant generation capacity	10	megawatts	Plant Cost	$	20,000,000
2 - Construction cost per kilowatt	$ 2,000		Ann KWH		87600000
3 - Total cost of plant	$ 20,000,000		MW Size		10
4 – Power purchase agreement	30	year term	Build Cost	$	2,000
5 – Anticipated construction time	18	months	Price/KWH		0.09
6 – Maintenance costs	6%		PPA Term		360
7 - Sales price of the power	0.09	per kwh	Const Time		18
7 - Percent of Maximum Flow	93%		% Max Flow		93%
9 - Plant Efficiency Percentage	80%		Efficiency %		80%
10 - Annual KWH production	61263936		Maint. Dsct		6.00%
11 - Annual Revenue	$ 5,513,754		Total Dsct		69.94%

Year	**Ann. Revenues**	**Total Revenues**
1	$ -	$ -
2	$ 5,513,754	$ 5,513,754
3	$ 5,513,754	$ 11,027,508
4	$ 5,513,754	$ 16,541,263
5	$ 5,513,754	$ 22,055,017
6	$ 5,513,754	$ 27,568,771
7	$ 5,513,754	$ 33,082,525
8	$ 5,513,754	$ 38,596,280
9	$ 5,513,754	$ 44,110,034
10	$ 5,513,754	$ 49,623,788
11	$ 5,513,754	$ 55,137,542
12	$ 5,513,754	$ 60,651,297
13	$ 5,513,754	$ 66,165,051
14	$ 5,513,754	$ 71,678,805
15	$ 5,513,754	$ 77,192,559
16	$ 5,513,754	$ 82,706,314
17	$ 5,513,754	$ 88,220,068
18	$ 5,513,754	$ 93,733,822
19	$ 5,513,754	$ 99,247,576
20	$ 5,513,754	$ 104,761,331
21	$ 5,513,754	$ 110,275,085
22	$ 5,513,754	$ 115,788,839
23	$ 5,513,754	$ 121,302,593
24	$ 5,513,754	$ 126,816,348
25	$ 5,513,754	$ 132,330,102
26	$ 5,513,754	$ 137,843,856
27	$ 5,513,754	$ 143,357,610
28	$ 5,513,754	$ 148,871,364
29	$ 5,513,754	$ 154,385,119
30	$ 5,513,754	$ 159,898,873

AUSTRIA

The **Wienerwaldsee** (English:*Vienna Forest Lake*) is a shallow reservoir, located 20 kilometres west of Vienna, Austria.

It is located just north of Austria's main motorway, the West Autobahn, between Tullnerbach and Neu-Purkersdorf. It was created over three years, 1895–1897, by damming the Wienfluss (The Wien) and letting it fill the valley behind. The area around the lake is a nature conservation area. On the northern shore, near the weir, stands the statue of Wilhelm Kress. He was an early pioneer of seaplanes and during testing one of his prototypes sank without trace after hitting debris on the surface. The long distance Westbahn (*Western Railway*) runs along the northern shore of the lake.

Vienna's drinking water originates in the Lower Austrian-Styrian Alps. The spring zone of the [First Vienna Spring Water Main] comprises the mountains Schneeberg, Rax and Schneealpe, while the spring zone of the [Second Vienna Spring Water Main] encompasses the Hochschwab Massif. Something close to a full circle was created by tapping the Pfannbauern Spring situated in the eastern foothills of the Hochschwab Massif and feeding it into the First Vienna Spring Water Main. The two spring zones cover 675 square kilometres.

Without pumps into the city

The water reaches Vienna without pumps through galleries (some of which were cut through sheer rock) by exploiting the natural drop resulting from the difference in altitude. The gravitational energy is even made use of along the course of the pipeline to generate electricity. Due to extensive spring protection, the water needs no treatment.

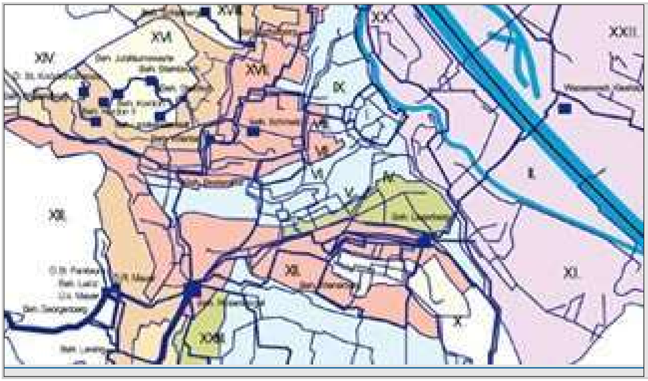
Best drinking water

Vienna finds itself in the unique situation of covering almost all of its drinking water demand from mountain springs; only a small portion is obtained by means of groundwater works. As a result, Vienna uses groundwater only in case of spring water main repairs, severe pipeline damage or extremely high water consumption volumes during hot spells.

Further information

Water Distribution

Balancing natural resources and varying water demand in the city is one of the central tasks of the Vienna Water. For this purpose, it operates 31 reservoirs (29 of these situated in Vienna) with a total capacity of 1.6 million cubic metres, which roughly corresponds to a four-day consumption volume.



The left-hand chart shows the main pipeline system of the Vienna Water and the pressures zones of Vienna's water supply.

The pipeline network is composed of several pressure zones, which are a consequence of the different altitude levels of the areas supplied. The First Vienna Spring Water Main supplies the topographically lower areas of Vienna (blue, violet), while the Second Vienna Spring Water Main handles the areas situated at higher altitudes (red, green, orange, brown and yellow) in the western part of Vienna. Those areas where natural water pressure alone is insufficient (yellow) are supplied by means of pumping stations. The water pressure in all pressure zones is constant at three to five bar.

The water reservoirs store the mountain spring water fed into the system and keep it fresh through continuous flow-through. The oldest reservoirs date from the 19th century – for example, the Rosenhügel Reservoir was completed in 1873.

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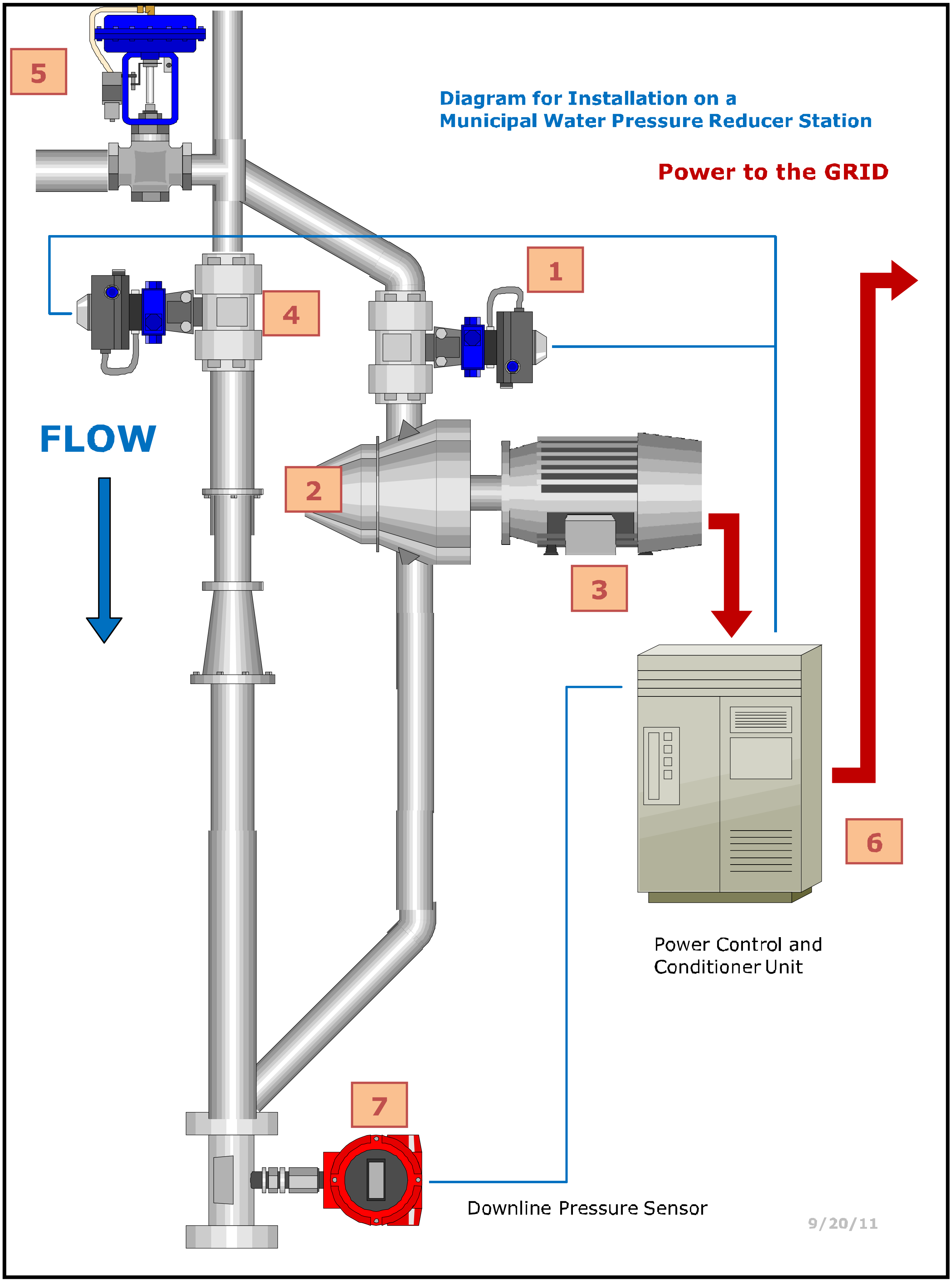

Diagram for Installation on a
Municipal Water Pressure Reducer Station
Power to the GRID
5
1
4
FLOW
2
3
6
Power Control and
Conditioner Unit
7
Downline Pressure Sensor
9/20/11

EXPLANATION OF COMPONENT PARTS

OF

DIAGRAM FOR INSTALLATION OF A MUNICIPAL WATER PRESSURE REDUCER HYDROELECTRIC POWER PLANT

(1) TURBINE INLET VALVE

This valve will be utilized to open the flow of water to the turbine. It is estimated that this valve may be larger than the pipe line diameter to allow for less head loss as water passes through. Final determination on its size will be made later.

This valve will have an electronic solenoid and will be a slave valve tied to the Pressure Relief Valve (4) and will be open when we are producing power and upon the loss of the grid, it will close within approximated 6 seconds.

(2) THE PUMP-TURBINE

This is a reaction type turbine that will operate in a variable speed mode. The speed of the turbine will be determined by the variations of both flow and head that may vary in the pipe at any given time.

(3) THE ALTERNATOR

It will also run in a variable mode as the speed of the turbine changes.

(4) THE PRESSURE REDUCER VALVE

This valve will have an electronic solenoid and be tied directly to the power control system. When we are producing power, the valve is closed to allow the water to bypass into the turbine line. If the grid loses power this valve opens immediately to allow for the water to continue through the municipality's water distribution or system.

This valve may be set to allow for any desired down line pressure and will dissipate any excess pressure internally. It is the master control to the slave valve just prior to the turbine. This valve will open first and then within a few

seconds the turbine inlet valve will close.

(5) THIS VALVE IS A 3" QUICK-ACTING PRESSURE RELIEF VALVE

This valve is activated by the incoming pressure tied to the water line going into the turbine (1) and the pressure relief valve (4). The valve has a hydraulic pressure regulator that is continuously sensing the water. When the pressure incoming to that valve exceeds a certain set point (adjustable), the valve quickly opens and will allow for the relief of the excess of pressure from the main system. When the pressure decreases below the set point, the valve closes slowly closes to avoid water hammer. This valve does not require any solenoid. It is hydraulically operated with the water line.

A dump line will be attached to this valve for discharge of excess water. It is anticipated that this valve may be open for not more than 10-15 seconds and this will not effect the down line pressure that has been set in the pressure relief valve (4).

(6) OUR POWER CONVERSION UNIT

This system will allow for the acceptance of the variable input of power from the alternator (3) and re-package it to tie directly into the municipality's power grid system. All power produced is automatically synchronized to the specifications of the power grid system.

The power conversion unit will be responsible to maintain the power to the solenoids for both valves (1) and (4). It will also be able to monitor the down line pressure by way of the pressure sensor (7) and take the differential pressure from the incoming line to produce power and maintain the down line pressure as required by the municipality. This system requires very little maned operation since it will take itself off line and bring the whole system back on line automatically.

(7) THE DOWN LINE PRESSURE SENSOR

It will be utilized to determine the draw of power available from the incoming water pressure and flow while keeping the desired down line pressure maintained.

The body of all valves are ductile iron with internal parts mostly SST.

All parts that come into contact with the municipality water do not affect the quality of the water since the parts are certified NSG for use in a drinking water approved environment.